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ABSTRACT

There is disclosed a communication system comprising a stationary transceiver defining an information portal in a vicinity thereof; a local server in communication with said transceiver, said local server being configured to identify and respond to a mobile processing-system present within said to perform a function on the basis of the identity of said mobile processing-system, said function being selected from the group consisting of: permitting building access to a portion of said building; and controlling an elevator in said building.
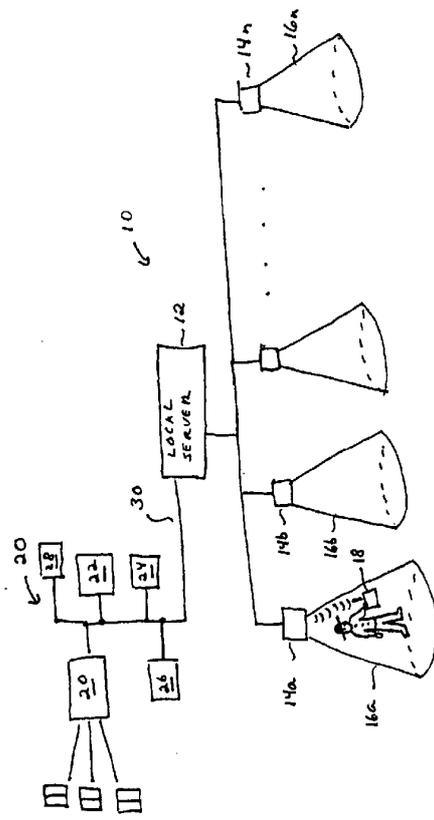
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FIG. 1

INFORMATION PORTAL

FIELD OF INVENTION

This invention relates to communication systems, and in particular, to wireless communication systems.

RELATED APPLICATIONS

This application is a divisional application of Australian application 2001253904 and relates to subject matter disclosed but not claimed in that application. Most of the content of 2001253904 is included herein to facilitate understanding of the present invention however if necessary reference may be made to the contents of 2001253904 which are herein incorporated by reference.

BACKGROUND

Mobile processing-systems, such as portable computers and personal digital assistants, are often provided with the ability to establish wireless connections with other processing systems. Such wireless connections enable a user to access internet sites while travelling. A user thus equipped is able to obtain real-time information from an internet site and to act immediately on the basis of that information. For example, a user on the way to the airport may use a mobile processing-system to discover that a flight has been cancelled and that it may be preferable to simply turn around and go home.

As a practical matter, however, it is difficult for a user of a mobile processing-system to conveniently acquire timely information while travelling. The process of identifying and accessing a web site can be cumbersome and difficult to attend to while coping with the exigencies of travel. In addition, the speed of wireless data transmission is itself limited by numerous physical constraints. For example, high speed data transmission requires high bandwidth. Such bandwidth may not be available simply because a finite spectrum must be shared by many channels. Inadequate signal-to-noise ration, resulting from noise or multi-path reflections, can result in high error rates, which in turn require frequent retransmission of data packets.

SUMMARY

In one aspect, a communication system incorporating the invention includes a stationary transceiver defining an information portal in a vicinity thereof and a local server in communication with said transceiver, said local server being configured to identify and respond to a mobile processing-system present within said information portal, and to interact with a building control system on the basis of the identity of said mobile processing-system.

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The communication system typically comprises an access control unit in communication with said local server, said access control unit being controlled by said local server on the basis of the identity of said mobile processing system.

In an embodiment the building control system is selected to be a system for permitting building access to a portion of said building.

In an embodiment the building control system is selected to be a building environmental control system.

In an embodiment the building control system is selected to be a building communication system.

In an embodiment the building control system is configured to be a system for controlling an elevator in said building.

In an embodiment the stationary transceiver is configured to establish real time communication with the mobile processing system.

In an embodiment the stationary transceiver defines an information portal in an elevator lobby.

In an embodiment the stationary transceiver defines an information portal in an elevator.

In an embodiment the stationary transceiver defines an information portal in a building lobby.

.   In an embodiment the stationary transceiver defines an information portal in a motor-vehicle parking area.

In an embodiment the stationary transceiver is one of a plurality of stationary transceivers, each of which communicates with the local server, and in which the local server is configured to trigger an alarm in the basis of a temporal gap between entry of the mobile processing system between a pair of stationary transceivers.

In an embodiment the stationary transceiver is one of a plurality of stationary transceivers, each of which communicates with the local server, and wherein the local server is configured to store information indicative of a path traversed by the mobile processing system

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between information portals.

Unless otherwise defined, all technical and scientific terms used herein have the same meaning as commonly understood by one of ordinary skill in the art to which this invention belongs. Although methods and systems similar or equivalent to those described herein can be used in the practice or testing of the present invention, suitable methods and systems are described below. All publications, patent applications, patents, and other references mentioned herein are incorporated by reference in their entirety. In case of conflict, the present specification, including definitions, will control. In addition, the systems, methods, and examples are illustrative only and not intended to be limiting.

Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise", "comprising", and the like, are to be construed in an inclusive sense as opposed to an exclusive or exhaustive sense, that is to say, in the sense of "including, but not limited to".

Other features and advantages of the invention will be apparent from the claims and from the following detailed description and its accompanying figures, in which:

BRIEF DESCRIPTION OF THE FIGURES
FIG. 1 is a communication system incorporating the invention.
FIG. 2 illustrates an application of the communication system of FIG. 1; and
FIGS. 3 and 4 show additional communication systems incorporating the invention.

DETAILED DESCRIPTION
Referring to FIG. 1, a communication system 10 incorporating the invention includes a local server 12 in data communication with one or more stationary transceivers 14a-n across a private network. Each stationary transceiver 14a-n maintains a corresponding information portal 16a-n extending around a vicinity thereof. When a person carrying a mobile processing-system 18, for example a portable computer or a portable digital-assistant, enters one of these information portals 16a, the stationary transceiver 14a maintaining that information portal 16a establishes wireless communication between the local server 12 and the mobile processing-system 18.

The mobile processing-system 18 and the stationary transceiver 14a can establish wireless communication by transmitting and receiving electromagnetic waves or acoustic waves modulated by data. In the case of electromagnetic waves, the waves can be radio-frequency waves, infrared waves, optical waves, or electromagnetic waves having any other frequency suitable for short-range data-communication. Acoustic waves are typically ultrasonic or mega sonic waves.

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In the case of radio-frequency waves, the establishment of the communication link can be completely passive, with no action required of the person other than entry into the information portal 16a. In the case of infrared or optical waves, or other waves having wavelengths much shorter than nearby scattering structures, the person establishes communication by pointing a port

5   on the mobile processing-system 18 toward the stationary transceiver 14a.

The stationary transceivers 14a-n can be deployed within a building in conjunction with elevator displays and lobby displays. This deployment is advantageous because the display can then be used to communicate information to the person carrying the mobile processing-system 18.

10   In addition, the display is already in data communication with the local server 12 and can therefore be easily modified to accommodate the stationary transceiver 14a. However, stand-alone stationary transceivers 14a-n can also be deployed at various locations without the presence of a nearby display.

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5   Stationary transceivers 14a-n are typically deployed at locations in which commuters and other travelers are likely to linger in the course of their travel. This ensures that the person is in an information data portal 16a-n long enough for meaningful data transmission to occur.

The local server 12 is also connected to one or more peripheral devices 20. Such peripheral devices can include elevator control system 22, building security systems 24, building
10   communication systems 26, building environmental-control-systems 28, and other systems that govern additional aspects of building functionality. These connections enable the local server 12 to control building functions in response to the identity and movement of a person carrying a mobile processing-system.

A local area network 30 links the local server 12, the peripheral devices, and the
15   stationary transceivers 14a-n. These links can be wired links, wireless links, or a mixture of both wired and wireless links.

In operation, a person carrying a mobile processing-system 18 enters one of the information portals 16a-n. The mobile processing-system 18 and the stationary transceiver 14a then establish communication, thereby providing a data path between the local server 12 and the
20   mobile processing-system 18. This enables the local server 12 to identify the mobile processing-system 18. The local server 12 can then interact with the peripheral devices in a manner consistent with the identity of the mobile processing-system 18.

To illustrate examples of some of the various types of interaction that are possible, it is instructive to follow the activities of a typical building tenant upon arrival at the building. FIG. 2
25   illustrates the progress of a tenant who, at time t_1, enters a parking lot 32 adjacent to a building 34.

Throughout this detailed description, reference is occasionally made to a tenant or user as having been detected and identified while within an information portal 16a-n. It is understood, however, that it is the mobile processing-system 18, and not the tenant or user, that is in fact
30   being detected and identified.

Referring now to FIG. 2, a first stationary transceiver 36a maintains a first information portal 38a at the entrance to the parking lot 32. As the tenant drives through this first information portal 38a, the local server 12 identifies the mobile processing-system 18 and notes a time-of-entry to be used later for calculating an appropriate parking fee.

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After a few minutes, the tenant parks and begins to walk toward a nearby elevator lobby 40. At time t_2, as the tenant approaches the elevator lobby 40, he enters a second information portal 38b maintained by a second stationary transceiver 36b. When the tenant enters this second information portal 38b, the second stationary transceiver 36b establishes communication between the local server 12 and the tenant's mobile processing-system 18. The local server 12 records the floor on which the tenant has parked. This data is later retrieved and used to program the elevator when the tenant re-enters an elevator at the end of the day. The local server 12 then interacts with the elevator control system 22 to call an elevator 42. By the time the tenant reaches the elevator lobby 40, the elevator 42 is already well on its way to meeting him.

The local server 12 also determines the floor that the tenant works on and, in a further interaction with the elevator control system 22, instructs the elevator 42 to proceed to that floor once the tenant enters a third information portal 38c maintained by a third stationary-transceiver 36c within the elevator 42. The local server 12 then interacts with the building environmental-control-systems 28 to turn on heat or air-conditioning at locations selected on the basis of the tenant's identity.

When the elevator 42 arrives to pick up the tenant at the designated floor of the parking garage, the local server 12 starts a timer. If the tenant fails to enter the third information portal 38c (located in the elevator 42) within a selected time, the local server 12 sends a message to building security personnel alerting them to the possibility of a mishap.

At time t_3, the tenant enters the third information portal 38c by boarding the elevator 42. The third stationary-transceiver 36c in the elevator 42 detects the tenant's entry into the third information portal 38c. Without further intervention from the tenant, the elevator 42 then carries the tenant to the floor selected by the local server 12.

After a few moments, the elevator reaches the selected floor 42, whereupon the tenant exits the elevator 42. At time t_4, the tenant enters a fourth information portal 38d maintained by a fourth stationary transceiver 38d. The local server 12 detects the tenant's entry into the fourth information portal 38d and sends an appropriate message to the building security system 24. In response, the building security system 24 unlocks an appropriate door 44 for the tenant.

In the unlikely event that the elevator 42 becomes stuck between floors, the elevator control system 22 detects the existence of this condition and signals the local server 12. The local server 12 then checks to see if there are any occupants within the information portal maintained in the elevator 42. If there are such occupants, the local server 12 uses the information portal maintained in the elevator 42 to provide a real-time communication link between the occupants

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and building security personnel. The communication link can be a streaming video or audio link. Preferably, the communication link thus established is a two-way video link.

The communication system **10** can also be used to broadcast announcements and other data directly to the mobile processing-system **18**. In such a case, a tenant enters any one of several information portals scattered throughout the building **34** while carrying a mobile processing-system **18**. Upon entry into any such information portal, the local server transmits appropriate data to the mobile processing-system **18**.

Another embodiment, shown in FIG. 3, also includes a fulfillment server **46** that interfaces the local server **12** with selected content providers **50a-c** across a global computer network **52**. The fulfillment server **46** communicates with the local server **12** over a private network **48** or a virtual private network. Data transport over the private network **48** can be carried out using a frame relay or xDSL service.

The addition of the fulfillment server **46** to the communication system permits the local server to relay information gathered by the fulfillment server **46** to a user whenever that user enters one of many information portals dispersed throughout a building **34**. A user-interface **54** associated with the fulfillment server **46** enables a user to request delivery of selected information from the content providers to the user's mobile processing-system **18**.

To illustrate the types of services that can be provided, it is useful to consider a user who wants to obtain a traffic report at the end of every working day. The activities of such a user are illustrated in FIG. 3.

At time t_1, the user accesses the user-interface **54** of the fulfillment server **46** using a web-browser **56** executing on the user's computer system **58**. Through this user-interface **54**, the user instructs the fulfillment server **46** to routinely make a traffic report available everyday.

At an appropriate time, and without further intervention by the user, the fulfillment server **46** retrieves traffic information from a content provider **50a**. The fulfillment server **46** then identifies the local server **12** associated with that particular user. After doing so, the fulfillment server **46** sends the requested information to that local server **12**. The local server **12** then stores that information in a cache **60** for delivery to the user's mobile processing-system **18** upon entry of that system into an information portal **16a-n**.

At time t_2, while the user is in the elevator **42**, the user enters or passes through an information portal while carrying the mobile processing-system **18**. The stationary transceiver

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14a maintaining that information portal sends a message to the local server 12 indicating the presence of the user's mobile processing-system 18. In response, the local server 12 retrieves the requested information from cache and sends it to the stationary transceiver 14a. The stationary transceiver 14a then transmits that data directly to the mobile processing-system 18. In this way, by the time the user leaves the information portal 16a, the mobile processing-system 18 will have collected the desired data.

The foregoing example illustrates the manner in which the communication system 10 provides programmed services. Such programmed services are characterized by a request that particular content be made available for delivery during a particular time interval. However, the communication system 10 can also provide real-time services. Real-time services are characterized by the delivery of a message indicating that a particular event has occurred.

To illustrate the use of the communication system 10 in providing real-time service, consider a user who wants to be alerted when, for example, a price of a particular stock has risen above a pre-determined level. The user would then access the user-interface 54 of the fulfillment server 46 using a web-browser 56 executing on the user's computer system 58. Upon doing so, the user could then request that the share price of a stock be monitored and that a message be sent if the share price reaches or exceeds the pre-determined level.

In response to the user's instruction, the fulfillment server 46 periodically accesses one or more of the selected content providers 50a-50c throughout the day to monitor the price of the stock. If the price exceeds the pre-determined threshold, the monitor sends a message to the local server 12 associated with the user. The local server 12 then caches this message for subsequent delivery to the user whenever the user enters an information portal 16a-n while carrying a mobile processing-system 18.

When the user carries the mobile processing-system 18 into an information portal 16a, the local server 12 detects the presence of the mobile processing-system 18, retrieves the message from cache, if any, and transmits it to the mobile processing-system 18.

A communication system 10 as described herein can also provide interactive services to a user. For example, the local server 12 can provide information such as locations of nearby restaurants, automated teller machines, train stations, and other services. Such a service is useful for travelers who are unfamiliar with the immediate neighborhood. In this case, the user need not interact with a fulfillment server 46 beforehand. Such information can be available upon request whenever a user carrying a mobile processing-system 18 enters an information portal 16a.

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5   Although the foregoing description teaches a communication system 10 installed in a building, such as an office building or a hotel, similar communication systems can be installed virtually anywhere that a person carrying a mobile processing-system 18 can be expected to linger momentarily. For example, communication systems of the type described herein can also be installed at such diverse locations as airports, train stations, train cars, and cruise ships.

10   A user of the communication system 10 need not be confined to a particular local server 12. For example, a communication system 10 can be installed to encompass a set of train stations, each of which has its own local server 12, as shown in FIG. 4.

In this application, each train station (of which only two are shown in the figure) includes a local server 12a-b having a local cache 60a-b. The first local server 12a provides a link

15   between four stationary transceivers 14a-d at a first train station and a fulfillment server 46. The second local server 12b provides a link between four additional stationary transceivers 14e-h at a second train station and the fulfillment server 46. The fulfillment server 52 provides a link to a plurality of content providers 50a-c across a global computer network 52. It is understood that the number of stationary transceivers in each train station and the number of train stations can be

20   varied without departing from the scope of the invention.

When a local server 12a detects the user at the train station or entering the train, a link is established in the manner already described in connection with FIGS. 1 and 3. would be delivered as already described above. For interactive services, such as email, or for extended services, such as music, the local server 12 would accept the request, cache it, and wait for the

25   next train station to complete the request. The user would then be notified when the information becomes available.

It is to be understood that while the invention has been described in conjunction with the detailed description thereof, the foregoing description is intended to illustrate and not limit the scope of the invention, which is defined by the scope of the appended claims. Other aspects,

30   advantages, and modifications are within the scope of the following claims.

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THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1.   A communication system comprising:

       a stationary transceiver defining an information portal in a vicinity thereof;

       a local server in communication with said transceiver, said local server being
           configured

               to identify and respond to a mobile processing-system present within said
                  information portal, and

               to interact with a building control system on the basis of the identity of
                  said mobile processing-system.

2.   The communication system of claim 1, further comprising an access control unit in
       communication with said local server, said access control unit being controlled by said
       local server on the basis of the identify of said mobile processing-system.

3.   The system of claim 1, wherein the building control system is selected to be a system for
       permitting building access to a portion of said building.

4.   The system of claim 1, wherein the building control system is selected to be a building
       environmental control system.

5.   The system of claim 1, wherein the building control system is selected to be a building
       communication system.

6.   The system of claim 1, wherein the building control system is configured to be a system
       for controlling an elevator in said building.

7.   The system of any one of claims 1 to 6, wherein the stationary transceiver is configured to
       establish real time communication with the mobile processing system.

8.   The system of any one of claims 1 to 7, wherein the stationary transceiver defines an
       information portal in an elevator lobby.

9.   The system of any one of claims 1 to 7, wherein the stationary transceiver defines an
       information portal in an elevator.

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10.   The system of any one of claims 1 to 7, wherein the stationary transceiver defines an information portal in a building lobby.

11.   The system of any one of claims 1 to 7, wherein the stationary transceiver defines an information portal in a motor-vehicle parking area.

12.   The system of any one of claims 1 to 11, wherein the stationary transceiver is one of a plurality of stationary transceivers, each of which communicates with the local server, and in which the local server is configured to trigger an alarm in the basis of a temporal gap between entry of the mobile processing system between a pair of stationary transceivers.

13.   The system of any one of claims 1 to 11, wherein the stationary transceiver is one of a plurality of stationary transceivers, each of which communicates with the local server, and wherein the local server is configured to store information indicative of a path traversed by the mobile processing system between information portals.

14.   A communication system as claimed in claim 1 and substantially as herein described with reference to the accompanying drawings.

Dated this 31st day of August 2006
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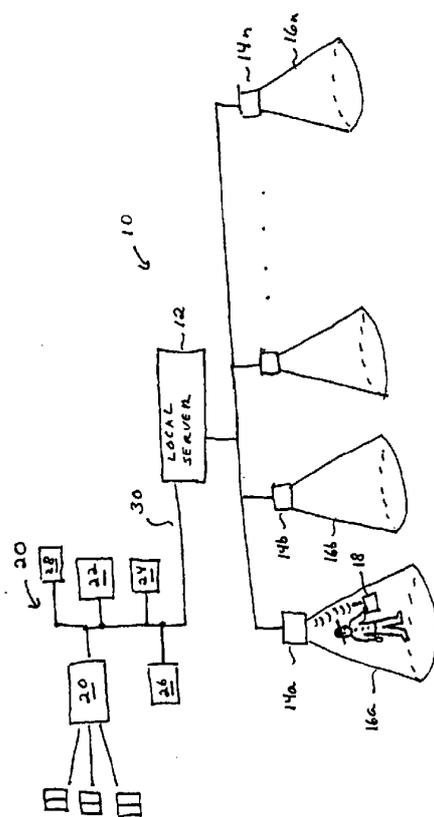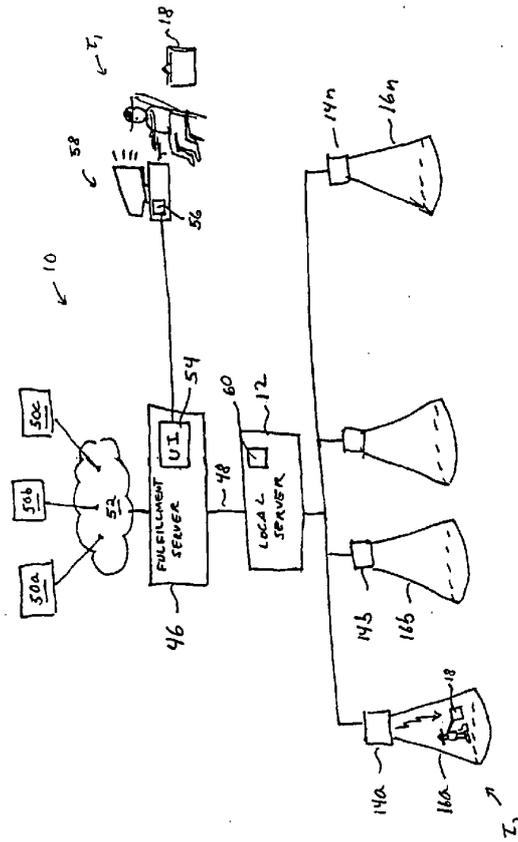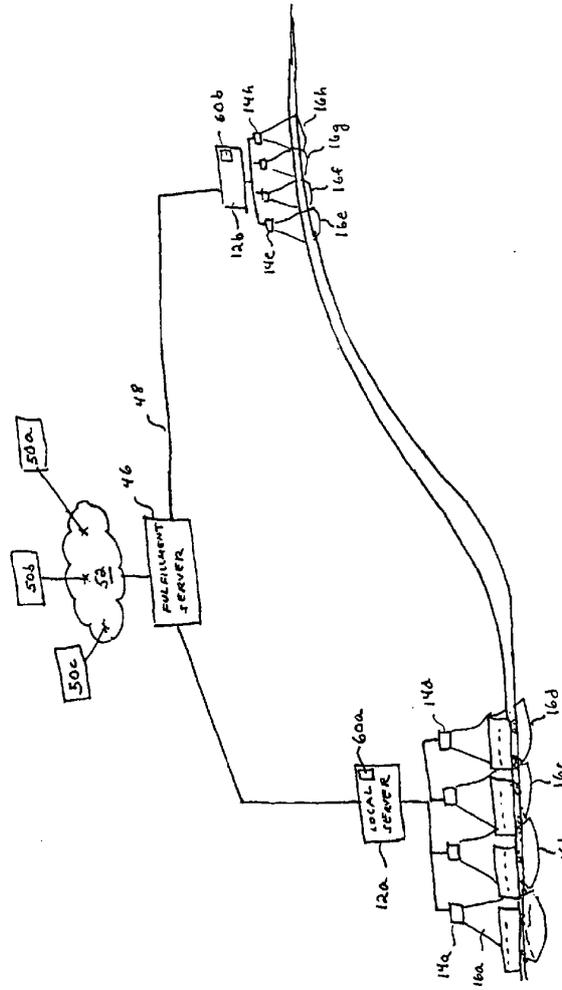Fellows Institute of Patent and
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FIG. 1

FIG. 2

FIG. 3

FIG. 4